

4B 50. A method for forming a polycrystalline aluminum nitride electrostatic chuck, comprising the steps of:

forming a green body consisting essentially of aluminum nitride powder without adding sintering aids;

sintering the green body to form a polycrystalline body, wherein sintering is carried out at a pressure of at least about 10MPa; and

exposing the polycrystalline body to a temperature of at least 1000°C in an atmosphere deficient in nitrogen.

#### REMARKS

Claims 1-45 and 47-50 are pending herein. Claim 46 has been cancelled hereby without prejudice or disclaimer, as being drawn to a non-elected invention, while new claims 47-50 have been added.

1. Applicant affirms the election of Group I.
2. Claims 1-2, 13-14, 18-22, 29-34, 37, 42-43 and 45 were rejected under § 112, second paragraph. Applicant respectfully traverses this rejection.

The PTO has taken a position that recitation of “atmosphere deficient in nitrogen” is vague and indefinite. However, Applicant respectfully submits that this recitation is sufficiently clear under § 112, second paragraph to one of ordinary skill in the art. In particular, the specification and claims provide numerical values for particular examples which meet the stated recitation of “deficient in nitrogen”. Furthermore, the very prior art cited by the PTO, U.S. Patent 6,017,485 to Enck et al. (commonly owned by the present assignee), expressly recites sintering of a body in a nitrogen-deficient atmosphere. Accordingly, in view of the prior treatment by the PTO of such language, as well as express examples in the specification and claims of atmospheres deficient in nitrogen, Applicant submits that such recitation is sufficiently precise and fully complies with § 112, second paragraph. Accordingly, withdrawal of the § 112, second paragraph rejection is respectfully requested.

3. Claims 1-12, 15-18, 32-35 and 42-45 were rejected under § 102(e)/103 over Enck et al. This rejection is respectfully traversed.

The presently claimed invention (Claim 1) is drawn to a method for reducing the volume resistivity of an aluminum nitride body. In this regard, Claim 1 expressly recites that the body consists essentially of aluminum nitride. The transitional phrase "consisting essentially of" is well defined and well understood transitional language. In the context of the present claims, the language requires that the composition of the body is limited to aluminum nitride and only those materials that do not materially affect the basic and novel characteristics of the claimed invention.

The presently claimed invention has been developed by the present inventor based, in part, on a recognition that use of conventional sintering aids in the ceramic body has the effect of negatively impacting the corrosion resistance (i.e., resistance to plasma attack during processing) of the body when in use, such as in environments commonly seen in semiconductor processing. The present claims, by use of the "consisting essentially of" language, accordingly expressly exclude the addition of materials such as sintering aids which affect material properties such as corrosion resistance. Turning to the present application, the foregoing interpretation of the claim language is made clear. See particularly page 2, lines 3-10, page 2, lines 15-21, page 3, lines 27-29, page 5, lines 22-24, page 13, lines 17-18, page 17, lines 5-7, for example. Accordingly, it is quite clear that the present claims exclude the presence of sintering aids in amounts that would materially affect the basic and novel characteristics of the claimed invention, which includes corrosion resistance.

Turning to the cited prior art reference, Enck et al., a process for making aluminum nitride-based semiconductor packaging components and electrostatic chucks is disclosed. However, this reference fails to disclose (or even remotely suggest) a ceramic body consisting essentially of aluminum nitride as discussed above. Each and every example of Enck et al. provides the addition of a sintering aid. In particular, 5 wt % of yttrium oxide is added to the aluminum nitride powder. (See column 15, Example 1, lines 20-24.) Enck et al. nowhere disclose or suggest the concept of eliminating such sintering aids. Indeed, to the contrary, Enck et al. disclose that sintering aids are essential to sinter the aluminum nitride body. See column 2, lines 54-67 of Enck et al., which states that without use of sintering aids, full densification cannot be carried out before the material decomposes. In this regard, the sintering

aids liquefy and permit liquid-phase densification at a temperature below the decomposition temperature of the material.

New claims 47-50 have been added to even more clearly define a preferable embodiment of the invention, in which no sintering additives are added.

For at least the foregoing reasons, Applicant respectfully submits that the cited prior art reference Enck et al. fail to disclose or even remotely suggest all features of the presently claimed invention. Accordingly, reconsideration and withdrawal of the § 103 rejection over Enck et al. are respectfully requested.

4. Claims 13-14, 19-31 and 36-41 were rejected under § 103 over Enck et al. as applied above in further view of Kurokawa et al. or Fukushima et al. Applicant respectfully submits that the additional secondary references fail to overcome the deficiencies of Enck et al. Accordingly, withdrawal of this rejection is respectfully requested as well.

5. Claims 1-12, 15-18, 32-35 and 42-45 were rejected under § 103 over Guiton et al. or Mallia et al. This rejection is respectfully traversed for the following reasons.

The disclosure of Guiton et al. is no more relevant than Enck et al., and expressly discloses the use of yttria sintering aids for all of the disclosed examples. Likewise, Mallia et al. disclose the use of art-recognized sintering aids in connection with the fabrication process disclosed therein. Mallia et al. and Guiton et al. fail to even remotely suggest elimination of such sintering aids, amounts of which are excluded by the present claims which affect the basic and novel characteristics of the claimed invention.

For at least the foregoing reasons, Applicant respectfully submits that the presently claimed invention would not have been obvious over Guiton et al. or Mallia et al. Accordingly, reconsideration and withdrawal of the § 103 rejection are respectfully requested.

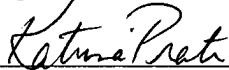
6. Claims 13-14, 19-31 and 16-41 were rejected under § 103 over Guiton et al. or Mallia et al., in further view of Kurokawa et al. or Fukushima et al. Applicant respectfully submits that this rejection is deficient for the reasons advanced above. Accordingly, withdrawal of this rejection is respectfully requested as well.

Applicant respectfully submits that the present application is in condition for allowance. Accordingly, the Examiner is requested to issue a Notice of Allowance for all pending claims.

Should the Examiner deem that any further action by the Applicant would be desirable for placing this application in even better condition for issue, the Examiner is requested to telephone Applicant's undersigned representative at the number listed below.

**CERTIFICATE OF MAILING**

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to Commissioner for Patents, Washington, D.C. 20231 on the date shown below.



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10/25/02

Date

Respectfully submitted,



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